

# Short-term effects of alcohol and sugars on cognitive functions in young, healthy adults: Randomized, controlled cross-over study

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## Introduction:

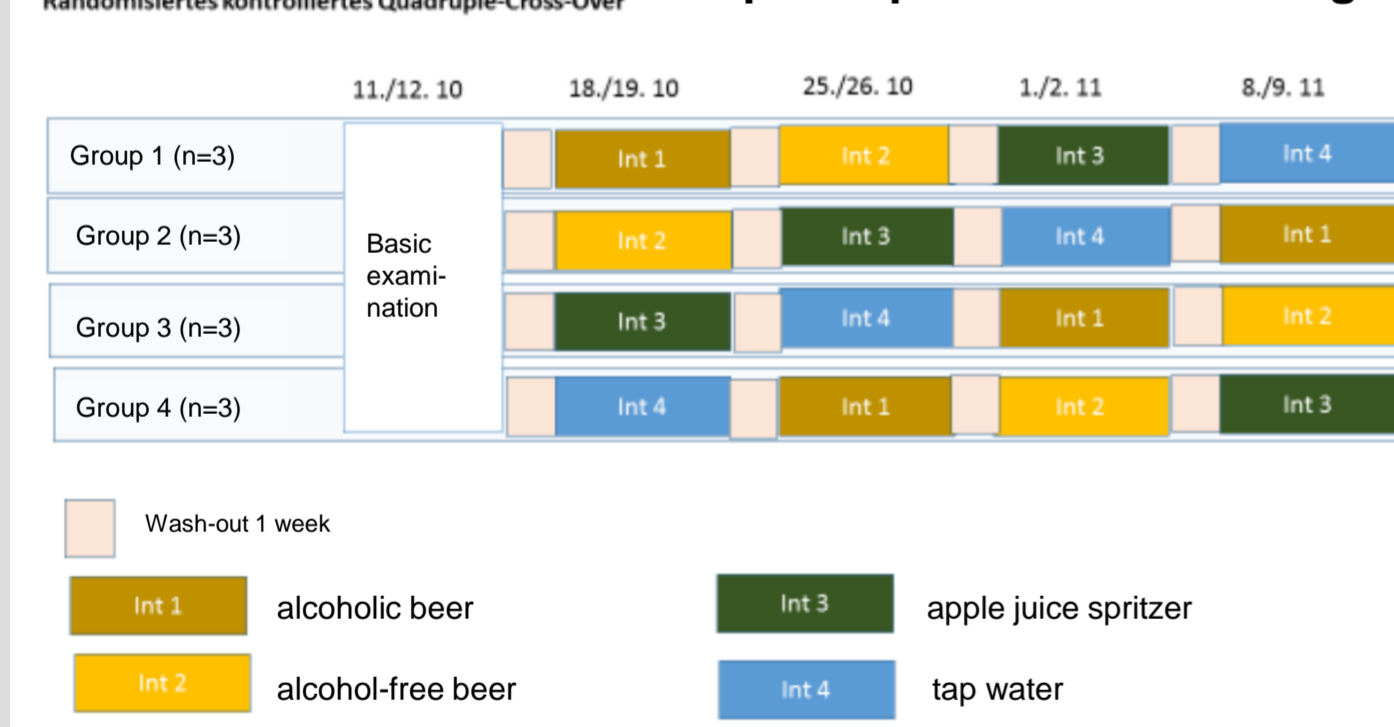
Long-term exposure of alcohol and sugars affect cognitive abilities, with alcohol having detrimental effects. Less clear is, whether single dose exposure to moderate amounts of alcohol or sugars immediately affects neuropsychological performance in young, healthy adults.

## Objectives:

To evaluate the immediate effects of alcohol- or sugar-containing beverages on verbal fluency and the ability to concentrate.

## Methodology:

randomized controlled trial in quadruple-cross-over design



- 12 healthy volunteers
  - 7f/5m
  - BMI:  $25.1 \pm 3.2 \text{ kg/m}^2$
  - age:  $25.5 \pm 3.7 \text{ yrs.}$
- after over-night fasting
- 4 interventions, each test drink á 500ml

Verbal fluency and the ability to concentrate were evaluated 15 min after beverage intake. Blood pressure, pulse and fasting glucose were measured at baseline and 30 min after intervention.

## Results:

Two-group comparisons of SLCT between alcoholic beer and apple juice spritzer ( $41 \pm 14$  vs.  $46 \pm 14$  correct answers,  $p=0.049$ ) or water ( $41 \pm 14$  vs.  $48 \pm 11$ ,  $p=0.022$ ) reflected a significant negative short-term impact of alcohol (figure 1).

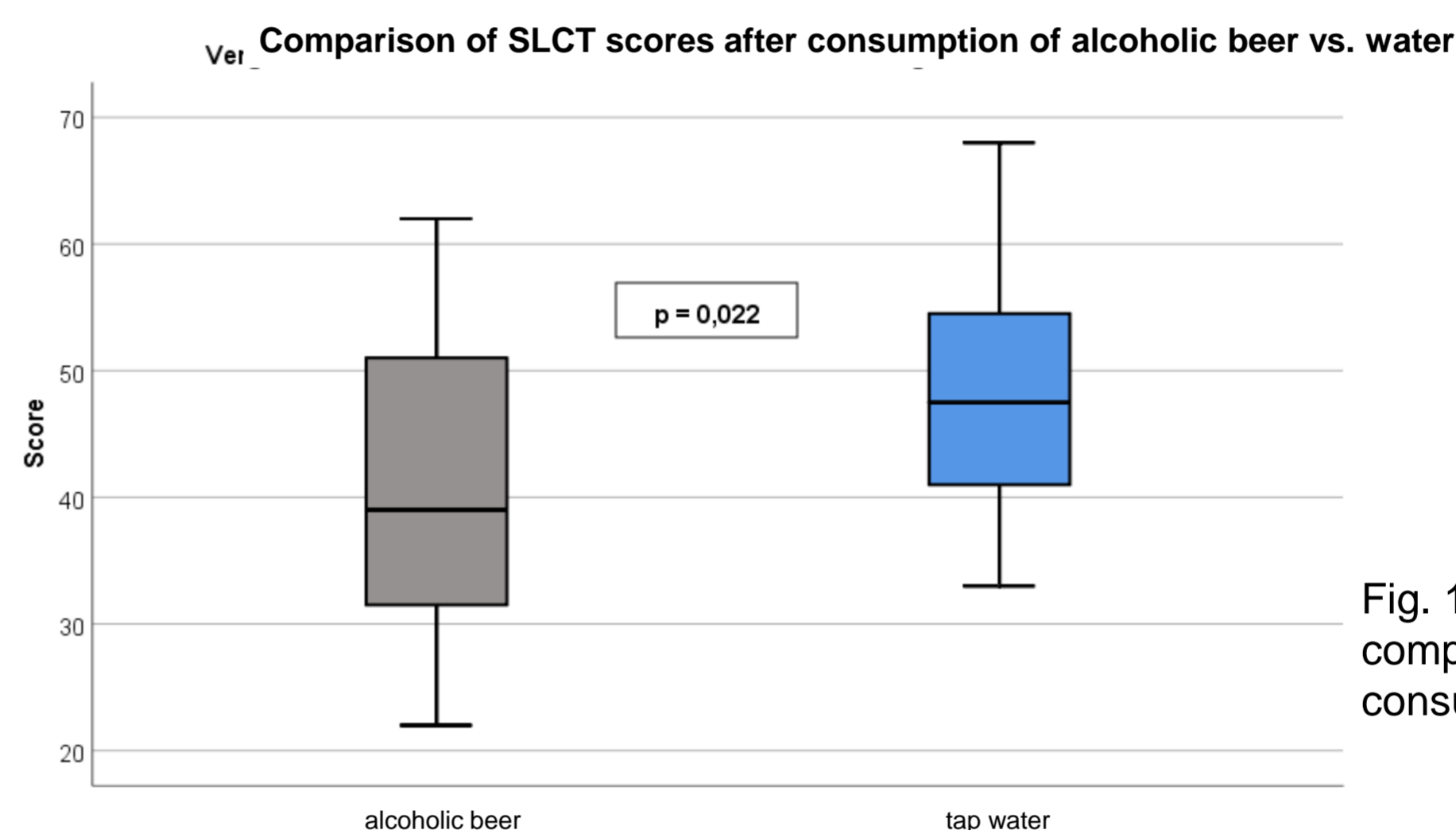


Fig. 1 Box-plots presentation for the comparison of the blood sugar after the consumption of the individual interventions

Alcohol did not affect verbal fluency over all groups ( $p=0.938$ ) or in any two-group comparison. Sugar did not affect cognitive functions over all groups (RWT:  $p=0.938$ ; SLCT:  $p=0.363$ ) or in any sub-group's comparison.

As expected mean blood glucose rose 30 min after intake of apple juice spritzer ( $+22.0 \text{ mg/dL}$ ,  $p<0.001$ ). Surprisingly, blood glucose increased even more after non-alcoholic beer ( $+34.3 \text{ mg/dL}$ ,  $p<0.001$ ) (figure 2). Water intake decreased blood glucose concentration consistently ( $-4.9 \text{ mg/dL}$ ,  $p<0.029$ ). Blood pressure or pulse was not affected by any intervention.

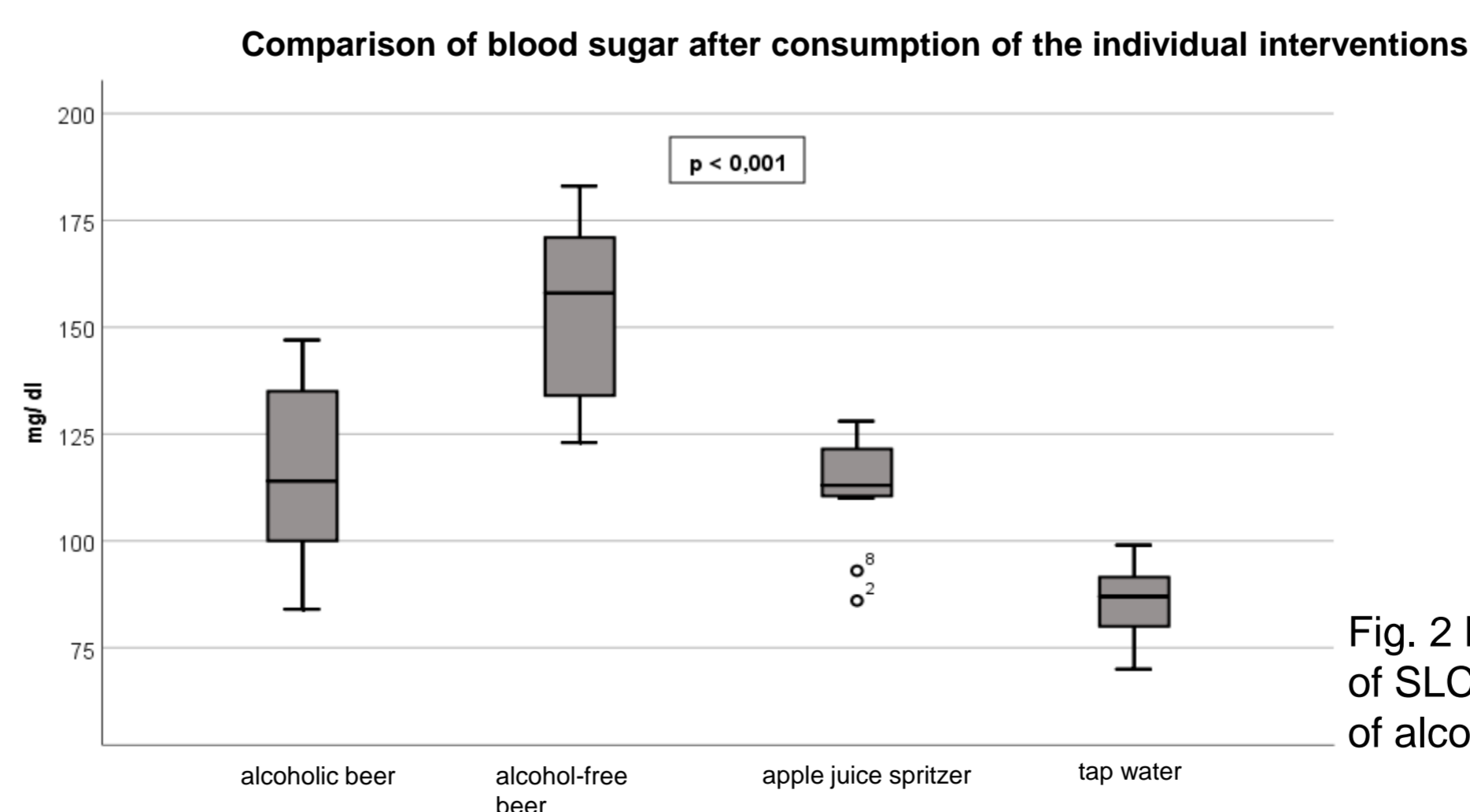


Fig. 2 Box-plots showing the comparison of SLCT scores after consumption of alcoholic beer vs. water

**Conclusion:** Short term intake of alcohol did not affect verbal fluency but decreased the ability to concentrate. Against our expectation's sugars showed no positive effect on cognitive functions. The limited ability to concentrate caused by alcohol can affect the activities in daily life.

[1] Regensburger word fluency test (RWT), Aschenbrenner; 2000.

[2] Six-letter-cancellation-test (SLCT), Pradhan; 2008.